CLAIMS

1. A method of generating routing information in a data communications network having as elements nodes and links, the method comprising the steps performed at a first network element of:

receiving at the first network element information relating to a change in the network at a second network element, determining a set of network elements affected by the change in the network, identifying a sequence for updating of routing information at each element in the affected set, and updating the routing information at the first element in sequence.

2. A method as claimed in claim 1 further comprising the step, of determining if the updated routing information differs from the routing information prior to the network change and maintaining the prior routing information at the first network element upon receipt of the information relating to the change if not.

3. A method as claimed in claim 1 in which the first network element updates after a delay derived from the updating sequence.

4. A method as claimed in claim 3 further comprising the step of determining, as an affected set, the set of nodes from which a target network element is reachable via the second network element.

5. A method as claimed in claim 4 in which the second network element is a link and the target network element is an adjacent node.

6. A method as claimed in claim 4 further comprising the step of updating the first network element upon receipt of the information relating to the change if the first network element is not in the affected set.

7. A method as claimed in claim 4 in which the delay is a function of the number of hops from the first network element to the furthest network element in the affected set.

8. A method as claimed in claim 7 in which the delay is derived to ensure that the first network element only updates its routing information after all preceding network elements in the sequence have updated their routing information.

9. A method as claimed in claim 7 further comprising the step of identifying branches of the affected set upstream of the first network element relative to the second network element to which the first network element does not forward data directly or indirectly and disregarding any network elements on the identified branches as the furthest network element.

10. A method as claimed in claim 4 further comprising the step of determining an affected set for each destination network element reachable via the second network element and deriving a delay for data for a destination as a function of the number of hops to the furthest node in the respective affected set for that destination.

11. A method as claimed in claim 10 in which the change in the second network element comprises a link cost increase and the affected set comprises the set of network elements from which the target network element is reachable prior to the network change.

12. A method as claimed in claim 11 in which the delay is a function of the number of hops from the first network element to the furthest network element in the affected set upstream of the first network element relative to the second network element.

13. A method as claimed in claim 11 further comprising the step of identifying branches of the affected set upstream of the first network element relative to the second network element to which the first network element does not forward data directly or indirectly and disregarding any network elements on the identified branches as the furthest network element.

14. A method as claimed in claim 4 further comprising the step of determining if the first network element forwards directly or indirectly data to nodes of the affected set upstream of the first network element relative to the second network element and, if not, identifying the first network element as the furthest node.

15. A method as claimed in claim 9 in which the change in the second network element comprises a link cost decrease and the affected set comprises the set of network elements from which the target network element is reachable after the network change.

16. A method as claimed in claim 1 further comprising the step of receiving a notification from a preceding network element in the sequence and updating the routing information upon receipt of the notification.

17. A computer readable medium comprising one or more sequences of instructions for a data communications network having as elements links and nodes, which instructions, when executed by one or more processors, cause the one or more processors to perform the steps of the method of any of claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 or 15.

18. An apparatus for generating routing information in a data communications network having as elements nodes and links, comprising means for receiving at a first network element information relating to a change in the network at a second network element, means for determining a set of network elements affected by the change in the network, means for identifying a sequence for updating of routing information at each element in the affected set, and means for updating the routing information at the first element in sequence.

19. An apparatus as claimed in claim 18, in which the means for identifying an updated sequence determines if the updated routing information differs from the routing information prior to the network change and the means for updating maintains the prior routing information at the first network element upon receipt of the information relating to the change if not.

20. An apparatus as claimed in claim 18 in which the means for updating updates after a delay derived from the updating sequence.

21. An apparatus as claimed in claim 20 further comprising means for determining, as an affected set, the set of nodes from which a target network element is reachable via th second network element.

22. An apparatus as claimed in claim 21 in which the second network element is a link and the target network element is an adjacent node.

23. An apparatus as claimed in claim 21 in which the means for updating updates the first network element upon receipt of the information relating to the change if the first network element is not in the affected set.

24. An apparatus as claimed in claim 21 in which the delay is a function of the number of hops from the first network element to the furthest network element in the affected set.

25. An apparatus as claimed in claim 24 in which the delay is derived to ensure that the first network element only updates its routing information after all preceding network elements in the sequence have updated their routing information.

26. An apparatus as claimed in claim 24 further comprising means for identifying branches of the affected set upstream of the first network element relative to the second network element to which the first network element does not forward data directly or indirectly and disregarding any network elements on the identified branches as the furthest network element.

27. An apparatus as claimed in claim 21 further comprising means for determining an affected set for each destination network element reachable via the second network element and deriving a delay for data for a destination as a function of the number of hops to the furthest node in the respective affected set for that destination.

28. An apparatus as claimed in claim 21 in which the change in the second network element comprises a link cost increase and the affected set comprises the set of network elements from the target network element is reachable prior to the network change.

29. An apparatus as claimed in claim 28 in which the delay is a function of the number of hops from the first network element to the furthest network element in the affected set upstream of the first network element relative to the second network element.

30. An apparatus as claimed in claim 29 further comprising means for identifying branches of the affected set upstream of the first network element relative to the second network element to which the first network element does not forward data directly or indirectly and disregarding any network elements on the identified branches as the furthest network element.

31. An apparatus as claimed in claim 29 further comprising means for determining if the first network element forwards directly or indirectly data to nodes of the affected set upstream of the first network element relative to the second network element and, if not, identifying the first network element as the furthest node.

32. An apparatus as claimed in claim 21 in which the change in the second network element comprises a link cost decrease and the affected set comprises the set of network elements from which the target network element is reachable after the network change.

33. An apparatus as claimed in claim 18 further comprising means for receiving a notification from a preceding network element in the sequence and updating the routing information upon receipt of the notification.

34. An apparatus for generating routing information in a data communications network having as elements links and nodes, the apparatus comprising one or more processors; a network interface communicatively coupled to the processor and configured to communicate one or more packet flows among the processor and a network; and a computer readable medium comprising one or more sequences of instructions for generating routing information which instructions, when executed by one more processors, cause the one or more processors to perform the steps of the method of any of claims 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 12, 13, 14 or 15.